

THE IDENTITY AND DELIMITATION OF ALLIUM
TOLMIEI BAKER

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Biosystematic understanding of any group of species is a long-time undertaking during the course of which many minor studies must be made. These are of little consequence in themselves, but *in toto* they are indispensable to the accuracy and acceptability of the final conclusions. One series of such minor studies is concerned with the establishment of the taxonomic identity of each of the proposed names within the group. Others deal with the genetic, cytological, ecological, distributional, and phylogenetic relationships of the biological entities themselves. The results of these minor studies are usually incorporated into the final treatment where each takes up at most only a few lines, and are not scattered through the literature in separate papers. Occasionally, it may be advisable to present the conclusions from such a study in advance of the appearance of the final treatment. The identity of *Allium Tolmiei* seems to be such a case. The recent proposal of two superfluous names for this species (Traub, 1947) calls for a clarification of its identity in accord with the established principles of plant classification.

Allium Tolmiei generally has been accepted for the last seventy years as a valid species of the northwestern states (Watson, 1879; Coulter, 1885; Howell, 1902; Piper, 1906; Rydberg, 1917; Abrams, 1923; Peck, 1941), but there has not been similar unanimity as to the characteristics of the species to which the name should be applied. In the writer's opinion, all of these descriptions were drawn for the most part from specimens which he would refer to *A. Tolmiei*. In other words there has been unanimity in the acceptance of the name, but not in the delimitation of the species which must bear it.

The history of *Allium Tolmiei* in the literature precedes by many years the first appearance of the binomial. In his "Flora Boreali-Americana," Hooker (1839) mentions an unnamed variety β of *A. Douglasii*, with leaves longer than the scape, collected in the "Snake Country" allegedly by Tolmie. Whether or not these specimens were actually collected by Tolmie or by a friend, as he expressly states according to Piper (1906), is not relevant to the problem. In the following discussion, they will be referred to as Tolmie's specimens. The "Snake Country" would undoubtedly be in southwestern Idaho or adjacent Oregon whence come more recent collections closely resembling Tolmie's.

The binomial, *Allium Tolmiei*, was first proposed in 1876 by Baker, who undoubtedly had examined critically Tolmie's specimens preserved at Kew and arrived at the conclusion that they

represented a species distinct from *A. Douglasii*. Unfortunately, he did not describe his new species at that time, but merely cited Hooker's earlier reference to the collection. Thus the name might have remained a *nomen subnudum* had not it been taken up three years later by Watson (1879) and provided with a clear and unmistakable description. With this first adequate description, Watson cites: (1) Tolmie's specimens; (2) Hooker's figure of *A. Douglasii* (in part), about which he undoubtedly was confused; and (3) his own collection from Parley's Park in the Wasatch Mountains, Utah, which he had identified earlier as *A. tribracteatum*, but which now proves to be *A. Brandegei*. As far as can be ascertained, Watson's description was drawn entirely from Tolmie's specimens which are still preserved in an identifiable condition in the Gray Herbarium. He does not mention, for instance, the characteristic cellular reticulations on the bulb coats of *A. Brandegei* which he clearly illustrates in fig. 7 of Plate XXXVIII of the Botany of the King Expedition. It is necessary, then, in the typification of *A. Tolmiei*, to exclude both elements 2 and 3, above. This leaves *A. Tolmiei* Baker ex Watson (1879) exactly equivalent to *A. Tolmiei* Baker (1876) and *A. Douglasii* var. β Hooker (1839), these all being based on the same collection. It is probable that the first adequate description of the species which he attributes to Baker was actually drawn by Watson himself from the specimens preserved in the Gray Herbarium. It seems proper, therefore, to designate this sheet as the type rather than that presumably preserved at Kew.

Six years following the publication of Watson's description of *Allium Tolmiei*, Coulter (1885) accepted this species in his "Manual of the Botany of the Rocky Mountain Region." His description was compiled directly, word for word, from Watson, with certain rearrangements and deletions. Certainly, there is no basis for the assumption that this author had any first-hand knowledge of the species whatsoever, or that this description applies to any species other than that represented by Tolmie's specimens. This would be unimportant had Traub (1947) not made *Allium Tolmiei* Baker the basis of a new varietal combination under *A. Douglasii*, and *A. Tolmiei* "Coulter . . . non Baker" the basis of a new name. From the foregoing, it is clear that *A. Douglasii* var. β = *A. Tolmiei* Baker = *A. Tolmiei* Baker ex Watson = *A. Tolmiei* Baker ex Coulter, these being based on one and the same collection and that *A. Douglasii* var. *Tolmiei* (Baker) Traub and *A. idahoense* Traub, being equal to the same thing are equal to each other, and are accordingly superfluous synonyms of *A. Tolmiei*.

Once the taxonomic identity of a proposed name is established, the next step is the association of this name with a natural biological population. The methods developed by modern systematists for the association of a name with the proper biological entity differ materially from those used by their predecessors.

It is a well-known truism that no two individuals, in the ultimate analysis, are exactly alike. One cannot, therefore, restrict the application of a name to individuals which are exactly like the original ones and arrive at anything which could be called a useful classification. Classical systematy was essentially a mechanical sorting process whereby individuals were associated with extreme morphological forms deemed to represent species—usually on the basis of very slender evidence. That such species frequently coincided with natural units can be attributed to the nature of the material rather than to the reliability of the method. The modern emphasis is on the species as a natural biological phenomenon, whereas, the stress formerly was on actual or supposed specific differences. Modern species are bounded by discontinuities; classic species were marked by distinguishing morphological characters. The two are not the same. The aim of the old systematics was to provide each species with a name and a description. That of the new systematics is to understand the species and to name it only after the need for a name has been clearly established. Indeed, the modern systematist would prefer to arrive at his conclusions apart from and uninfluenced by pre-existing concepts. This is the only way in which he may be sure of avoiding the pitfalls inherent in the older method. *Allium Tolmiei* is a case in point.

Sporadically scattered over much of eastern Oregon and overlapping into adjacent states, there is a series of closely related local populations of the genus *Allium*. In a given locality, the plants are usually very much alike, although they may show some evident variation. In another locality, perhaps close at hand, they may be slightly different or even very different. The plants from locality to locality vary greatly in size, in the relative and absolute length, breadth, curvature, and glaucescence of the leaves, in the relative and absolute length, breadth, and thickness of the scape, whether this structure is slightly, moderately, or strongly flattened, wingless, narrowly or broadly winged, in the number of flowers in the umbel, and the relative and absolute lengths and thicknesses of the flowering pedicels, in the color of the perianth, and even in the intimate details of the floral structure, such as the presence or absence of crests on the ovary, and their development from obsolete to obscure to prominent. The total variation is enormous. Confronted by a half dozen specimens representing as many extremes, no person unacquainted with the complexities of intraspecific variation would question for a moment that each represented a distinct and definite species. If he had fifty of them at once, he might become suspicious, and consider them that anathema of the systematist, the polymorphic species. In all probability, however, he would pick out some three or four of the most conspicuously distinct and aberrant

types, and group the others around these, disregarding the fact that most of them could go into one pile as well as another. These departures from his type concept, he would attribute vaguely to ecological factors.

Modern experimental taxonomy provides a method of investigating such perplexing variation between natural populations. Some thirty collections from as many localities representing the above series have been assembled and grown side-by-side at Pullman under essentially uniform conditions. The distinctive characteristics which marked the parental populations are maintained in the garden. From herbarium studies, it can be inferred that only a small percentage of the local races within the series are represented in this living collection. There is no reason to suppose that within the series there is a single morphological hiatus which cannot be bridged or detoured through intermediate biological populations. Within the same area, however, and extending beyond it to the north and the south, is another series of similar populations, the *A. parvum* series, apparently distinguished at all times by a constant hiatus, the magnitude of which is much less than that of the difference separating any two of a number of extreme populations of either series. This is illustrative of the fact that the magnitude of a difference does not in itself make a species.

The thirty collections of the first series have been studied morphologically and cytologically, and the results of these studies form the basis of a paper in preparation (Ownbey and Aase, unpublished). It is sufficient to say here that Dr. Aase has found most of the local races of the series to be diploid, but that in one limited area, there exist, sometimes side-by-side, morphologically distinguishable diploid and tetraploid races, and that in another, the plants apparently are uniformly hexaploid. The tetraploid race is morphologically nearly indistinguishable from a diploid race growing in a nearby area. No diploid exactly corresponding to the hexaploid race is known, but the attenuated morphological characteristics by means of which it may be recognized are of exactly the same nature and are much less conspicuous than those which distinguish many of the diploid races. Thus it may be concluded that the entire series of intergrading populations represents only a single biological species for which a name must now be selected.

With specimens representing three different local populations of the above species at hand, Watson (1879) proposed, in the same paper, three species, *Allium Cusickii*, *A. pleianthum*, and *A. Tolmiei*, into which pigeon holes subsequent botanists have been vainly struggling to make their specimens fit. Later, Jones (1902) added *A. anceps* var. *aberrans*, and Tidestrom (1916) described the tetraploid as *A. platyphyllum*. Both of these were

promptly reduced to synonymy. Other later proposals probably belonging here have been made, but their identity has not been unequivocally established. The International Rules do not recognize priority of position, but give the subsequent author the privilege of choosing between them should two or more simultaneous proposals prove synonymous. Ordinarily, he picks the one in the prior position (*A. Cusickii*), but in this instance another choice seems imperative. There will always be those who consider Hooker's three Latin words an adequate botanical description, and date the effective publication of *A. Tolmiei* from 1876 instead of 1879, in spite of the fact that these three words describe equally well any one of at least half of the western American species of the genus. To avoid this confusion, the name selected must be the last in the series, *Allium Tolmiei*.

The established synonymy follows:

I. TYPONYS¹

Allium Tolmiei Baker ex Watson in Proc. Am. Acad. Arts and Sci. 14: 234. 1879, excluding references to illustration of *A. Douglasii* and Watson's collection from Parley's Park; Coulter, Man. Bot. Rocky Mountain Reg., p. 349. 1885; Howell, Fl. N. W. America, p. 642. 1902; Piper in Contr. U. S. Nat. Herb. 11 [Fl. Wash.]: 188. 1906, excluding specimens cited; Rydberg, Fl. Rocky Mountains and Adj. Plains, p. 161. 1917; Abrams, Illust. Fl. Pacific States 1: 387. 1923; Peck, Man. Higher Plants Oregon, p. 195. 1941.

Allium Douglasii var. β . Hooker, Fl. Bor. -Am. 2: 185. 1839.

Allium Tolmiei Baker in Bot. Mag. Ser. III. 32: under t. 6227. 1876, *nomen subnudum*.

Allium Douglasii var. *Tolmiei* (Baker) Traub in Herbertia 12 (1945): 68. 1947.

Allium idahoense Traub, *Ibid.*, p. 69.

II. METONYMS

Allium Cusickii Watson in Proc. Am. Acad. Arts and Sci. 14: 228. 1879; Howell, Fl. N. W. America, p. 642. 1902; Rydberg, Fl. Rocky Mts. and Adj. Plains, p. 161. 1917; Abrams, Illus. Fl. Pacific States 1: 387. 1923; St. John, Fl. S. E. Wash. and Adj. Idaho, p. 85. 1937; Peck, Man. Higher Plants Oregon, p. 195. 1941.

Allium pleianthum Watson in Proc. Am. Acad. Arts and Sci. 14: 233. 1879; Howell, Fl. N. W. America, p. 642. 1902; Rydberg, Fl. Rocky Mts. and Adj. Plains, p. 161. 1917; Abrams,

¹The terms "typonym" (a name based on the same type) and "metonym" (a name based on another member of the same group), defined in the "Code of Botanical Nomenclature," proposed in Bull. Torrey Bot. Club 31: 249-290. 1904, have not been generally adopted. They represent exceedingly useful concepts.

Illus. Fl. Pacific States 1: 386. 1923; Peck, Man. Higher Plants Oregon, p. 195. 1941.

Allium anceps var. *aberrans* Jones, Contr. West. Bot. No. 10, p. 10, fig. 9. 1902.

Allium platyphyllum Tidestrom in Torreyia 16: 242. 1916.

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NOTES ON THE GENUS TOWNSENDIA IN WESTERN NORTH AMERICA

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While identifying the Compositae collected by Miss Annie M. Alexander and Miss Louise Kellogg in the Sweetwater Mountains of California and Nevada during the summer of 1945, I encountered a number of specimens of *Townsendia*. An investigation of herbarium material of the genus was undertaken, and since field studies seem out of the question at present, I am recording here some of my results.

In the revision of the genus by Larsen (1927), nineteen species are recognized for the genus. Larsen lists only two species, *Townsendia scapigera* and *T. Watsoni*, as occurring in the states of California and Nevada. The last few years have witnessed increasing collecting activity in the Great Basin area and additional material has been obtained so that seven species are now known to occur in these states.

Since the publication of Larsen's paper, two new species have been described, *T. minima* Eastwood (1936) from Utah and *T. diversa* Osterhout (1928) from Colorado. The description of another new species in the present paper brings the total number of species recognized to twenty-two, some of which doubtfully deserve specific rank.

All of the specimens cited are deposited in the Herbarium of the University of California, Berkeley, unless otherwise indicated. During the course of this study, material has been examined from the California Academy of Science (CA), the Missouri Botanical Garden (MBG), the Dudley Herbarium of Stanford University, the United States National Herbarium, the Intermountain Herbarium of Utah State Agricultural College (IH), and the Rocky Mountain Herbarium of Wyoming University. I would like to thank the curators of these herbaria for the privilege of examining their specimens.

Townsendia sericea has been collected in both California (Mono County: Maguire & Holmgren 26109; Duran 1661) and Nevada (Nye County: Maguire & Holmgren 25818, 25944). *Townsendia incana* is known from Nevada from a specimen collected by